Amendments to the Claims

Please amend Claims 1, 4, 12, and 19. The Claim Listing below will replace all prior versions of the claims in the application:

Claim Listing

1. (Currently Amended) A packet switch for switching packets, carried in time slots, between traffic sources and traffic sinks, the switch having plural input sectors and output sectors, each input sector being arranged to hold at least one queue per output sector, each input sector having plural input ports, each input port being arranged to receive packets from respective traffic sources, each output sector having plural output ports and being arranged to hold at least one queue per output port, ~~wherein~~ the input sectors ~~are~~ being connected to the output sectors via links configured to afford speed-up of data transfer, ~~wherein~~ the links ~~comprise~~ comprising a set of optical links, each optical link being connected to plural optical switches and arranged to carry packets from a respective input sector to any of the plural output sectors, the set of optical links resulting in fixed connections between the input and output sectors according to a traffic matrix that includes ~~and wherein the switch has means for cyclically connecting different subsets of the set of links between the input sectors and the output sectors, to allow transfer of packets according to a matrix with~~ elements that specify the time-average required capacity between each traffic source – traffic sink pair, wherein the ~~set of links is varied~~ switch includes a circuitry for controlling the plural optical switches to vary the resulting connections of the set of links in accordance with variations in the time-average capacity and not at a time slot rate.

2. (Original) A packet switch according to claim 1 wherein each input sector is arranged to hold one queue per output of the output sectors to provide virtual output queuing (VOQ).

3. (Original) A packet switch according to claim 1 wherein each input sector is arranged to hold only one queue per output sector.

4. (Currently Amended) A packet switch having plural input sectors and output sectors,

each input sector having an input sector memory and plural input ports, each port being arranged to receive packet data, carried in time slots, between traffic sources and traffic sinks, the input sector memory being arranged to store plural input queues of packet data from said input ports, at least one said input queue corresponding to each respective output sector, the input sector memory having a respective output for each said input queue,

each output sector having an output sector memory and plural output ports;

the output sector memory being arranged to store plural output queues and having plural inputs for packet data and being arranged to pass packet data to a respective output port, the packet switch further having a ~~population of links~~ switch core and a control device;

wherein said ~~population~~ switch core comprises plural optical links for carrying packet data between outputs of the input sector memory and inputs of the output sector memory, and

wherein the control device is operable to ~~form a selection of links from said population to provide speed-up, and thereby~~ enable packet data transfer between said outputs and inputs using said ~~selection of~~ optical links to allow transfer of packets according to a traffic matrix with elements that specify the time-average required capacity between each traffic source – traffic sink pair, each optical link being connected to plural optical switches and arranged to carry packets from a respective input sector to any of the plural output sectors, the set of optical links resulting in fixed connections between the input and output sectors according to a traffic matrix having elements relating to a currently existing traffic pattern and the control device being further operable to vary ~~said selection~~ the resulting connection of the set of links in accordance with variations in the time-average capacity and not at a time slot rate.

5. (Original) A packet switch as claimed in claim 4, wherein each input sector memory is arranged to store one input queue per input port of the sector for each output port of the switch.

6. (Original) A packet switch as claimed in claim 5, wherein each output sector memory is arranged to store one output queue per output port of the sector for each input port of the switch.

7. (Original) A packet switch as claimed in claim 4, wherein each input sector memory is arranged to store a single output queue per output sector for each input port of the switch.

8. (Original) A packet switch as claimed in claim 6, wherein each output sector memory is arranged to store a single output queue per output port of the sector.

9. (Previously Presented) A packet switch as claimed in claim 4, wherein each link has a higher packet rate than the line rate of packet flow at switch input ports to provide said speed-up.

10. (Previously Presented) A packet switch as claimed in claim 4, wherein each link has a similar packet rate to the line rate of packet flow at switch input ports.

11. (Previously Presented) A packet switch as claimed in claim 4, wherein the control device comprises a processor constructed and arranged to construct a service matrix having integer entries in units of the link rate and having row and column sums equal to the number of ports from each input sector and ports of each output sector such that in said units of the internal link rate, each of said integer entries exceeds the corresponding entry in a desired traffic matrix, said matrix having elements formed by the said desired offered load at the switch inputs on the basis of each input and output port; and to decompose the service matrix into its constituent permutations thereby to control said links using said permutations.

12. (Currently Amended) A method of routing packets transported in time slots between traffic source and traffic sinks using a packet switch having plural input sectors and

output sectors, each input sector being arranged to hold at least one queue per output sector, each output sector having plural output ports and being arranged to hold at least one queue per output port, the packet switch being configured to allow transfer of packets according to a traffic matrix with elements that specify the time-average capacity required between each traffic source – traffic sink pair, the method comprising:

providing a set of links for connecting the or each input sector queue to respective output sector queues,

connecting at least some input sector queues to respective output sector queues using a subset of said set of optical links, said subset affording speed-up of data transfer, each optical link being connected to plural optical switches and arranged to carry packets from a respective input sector to any of the plural output sectors, the set of optical links resulting in fixed connections between the input and output sectors according to a traffic matrix with elements relating to a currently existing traffic pattern, and

~~selecting different subsets of the set of links between the input sectors and the output sectors and~~ varying the resulting connections of the set of links in accordance with variations in the time-average capacity and not at a time slot rate.

13. (Previously Presented) A method according to claim 12, further comprising determining the variations in the time-average capacity.

14. (Original) A method according to claim 13, wherein the determining step comprises monitoring input queue states.

15. (Original) A method according to claim 13, wherein the determining step comprises monitoring input packet arrivals.

16. (Previously Presented) A method according to claim 12, wherein the providing step comprises constructing a service matrix having integer entries in units of the internal link rate and having row and column sums equal to the number of ports from each input sector and ports of each output sector such that, in said units of the internal link rate, each of

said integer entries exceeds the corresponding entry in a desired traffic matrix, said desired traffic matrix having elements formed by the said desired offered load at the switch input ports on the basis of each input port and output port;

decomposing the service matrix into its constituent permutations and controlling said links using said permutations.

17. – 18. (Cancelled)

19. (Currently Amended) A line card interface device for carrying traffic defined by a traffic matrix with elements that specify the time-average capacity required between each traffic source – traffic sink pair, the capacity having a statistical distribution which varies at a given variation rate, the interface device comprising an optical selector and a control device, the optical selector having plural interface inputs for connection to a first multi-path optical connection, plural interface outputs for connection to a second multi-path optical connection, and plural optical paths connecting the interface inputs to the interface outputs, the connections of the plural optical paths being fixed between timeslots and arranged to meet the time-average capacity required between each currently existing traffic source-traffic sink pair, wherein the optical paths allow transfer of more packets per unit time than are incident per unit time at the plural interface inputs, thereby providing speed-up, the optical selector further having plural optical switches, each said optical switch being operable to enable passage of optical data therethrough and to prevent passage of optical data therethrough according to control signals, the speed of response to the control signals being substantially less than said line rate, and the control device having means for applying control signals to the switch control inputs at a rate in accordance with the statistical variations in the time-average capacity and not at a time slot rate.

20. (Original) A line card interface according to claim 19, wherein the optical paths are spatially distinct and are greater in number than the number of the plural interface inputs to provide spatial speed-up.

21. (Previously Presented) A line card interface according to claim 19, wherein the interface inputs and outputs are divided into input groups and output groups, each input group having a distributor, said distributor having one or more of said interface inputs and plural outputs, each output group having a multiplexer having an input, one or more interface outputs, and the optical paths comprise an optical connection wherein each input group is connectable to each output group.

22. (Original) A line card interface according to claim 21, wherein the distributor and the multiplexer are electronic.

23. (Original) A line card interface according to claim 21, wherein the distributor and the multiplexer are optical.

24. (Previously Presented) A line card interface according to claim 21, wherein each input group has a respective input group memory, said distributor having plural outputs for writing to said input group memory and each output group has a respective output group memory, said multiplexer input being connected to receive outputs from said output group memory.

25. (Previously Presented) The line card interface according to claim 21, wherein the optical connection comprises an optical fibre device.

26. (Previously Presented) A line card interface according to claim 21, wherein the optical connection comprises optical components providing free-space paths in use.

27. (Previously Presented) A line card interface according to claim 21, wherein each input group has the same number of inputs as the number of outputs of said output groups.

28. (Previously Presented) A line card interface according to claim 21, wherein each memory is a dual-port memory having an input port for writing to the memory and an output port for reading from the memory.

29. (Previously Presented) A line card interface according to claim 21, having latching circuitry for storing packet data for input to said interface inputs whereby said multi-path optical connections have a line rate reduced compared to said line rate.

30. – 34. (Cancelled)